



# MGSM960

## Information and Decision Analysis

Term 3 North Ryde 2019

*Department of Actuarial Studies and Business Analytics*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff Lecturer John Croucher <a href="mailto:john.croucher@mq.edu.au">john.croucher@mq.edu.au</a>
Credit points 4
Prerequisites Admission to MBA or MMgmt or PGDipMgt or GradDipMgt or MSocEntre or GradCertSocEntre
Corequisites
Co-badged status
Unit description This unit provides quantitative/statistical research tools, data analysis and computer modelling necessary to help the modern business manager with strategic planning, tactical decision-making, and resolving business problems. It also covers the efficient use of all resources to enhance management effectiveness. The overall aim is to improve the reliability of decisions made and to develop better strategy through the use of scientific method.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.

Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.

From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.

Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Individual assignment</u>	20%	No	Session 7 of class
<u>In-class test</u>	20%	No	Session 10 of class
<u>Final examination</u>	60%	No	Exam week: 2 - 7 Sep 2019

### Individual assignment

Due: **Session 7 of class**

Weighting: **20%**

**Format:** Question set

In order to understand properly the material covered in the course, it is necessary for you to practice what you have learned. The individual assignment (and exercises) provides an opportunity for you to gain experience in the techniques and concepts. There is only one individual assignment that you should do by yourself. It covers what you have learned in the lectures up to and including session 5. The solutions to this assignment will be discussed during the final lecture and also placed on the web site.

#### Extensions and penalties

No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

On successful completion you will be able to:

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.

- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## In-class test

Due: **Session 10 of class**

Weighting: **20%**

**Duration:** 1 hour

**Format:** Open book test

The in-class test, held under exam conditions during the class session, will include the material covered in session 1 - 8. You can use books, notes and a non-programmable calculator. It will consist of ten short answer/multiple choice questions. Notebook computers, iPads, tablets, PDAs and similar are not allowed. It is not necessary to pass this in-class test to pass the unit.

On successful completion you will be able to:

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## Final examination

Due: **Exam week: 2 - 7 Sep 2019**

Weighting: **60%**

**Duration:** 3 hours plus 10 minutes reading time

**Format:** Open book final examination

You are expected to present yourself for examination at the time and place designated in the MGSM examination timetable. The timetable will be available on 10 July 2019

at <https://students.mgsm.edu.au/sydney-students/units/exams/>.

The exam format will be **open book**, and will consist of a combination of multiple choice, short answer and problem solving style questions. More details on the exam will be provided in class.

The final examination will cover all topics dealt within the unit. You can use books, notes and a non-programmable calculator. Notebook computers, iPads, tablets, PDAs and similar are not allowed.

On successful completion you will be able to:

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## Delivery and Resources

### Required text

Croucher, John. S. (2018). Quantitative Analysis for Management, 5th edition. McGraw-Hill Education. ISBN: 9781760423834

**You should bring this textbook to all lectures as it is also a workbook.**

**Please note:** Students should only attain the 5th edition of this textbook, which is the only edition this class will be taught from. Furthermore, this course relies heavily on the learning material provided in the textbook (which also acts as an exercise book for in-class demonstration and activities). It is highly advised that students attain the required textbook as soon as possible and familiarise themselves with the textbook material, especially before the start of each class session for sessions with specific allocated chapters (which is made available in the unit schedule below as well as the class iLearn page).

### Where to purchase textbook?

**The Coop Bookshop:** The Coop Bookshop is our main retailer for textbooks and other related academic material. For information on textbook prices and online ordering, please refer to The Co-Op Bookshop webpage at <http://www.coop.com.au>

**McGraw Hill Education Australia – Online store:** This textbook is also available for order via the publisher's online store. For information on textbook prices and online ordering, please refer to the McGraw Hill Education Australia online store at <https://www.mheducation.com.au/9781760423834-aus-quantitative-analysis-for-management-5e-customised>.

**Disclaimer:** MGSM does not take responsibility for the stock levels of required textbooks from preferred retail outlets and other book retailers. While we advise our preferred book retail outlet, The Co-op Bookshop, of our maximum expected number of students purchasing specific required text each term, The Co-op Bookshop and other book retailers will make their own judgement in regard to their physical holding stock levels. To prevent disappointment if a textbook is out-of-stock, we highly advise students to order their textbooks as early as possible, or if the required textbook is currently out-of-stock, place an order with the book retailer as soon as possible so that these book retailers can monitor demand and supply, and adjust their stock orders accordingly.

## Additional recommended text

The text listed below are optional only. It is not compulsory to attain a copy.

- Croucher, John S. (2016). Introductory mathematics and statistics for business (6th edition- revised). McGraw-Hill.
- Render, B., Stair, R., Hanna, M.E. and Hale, T.S. (2015). Quantitative analysis for management (12th edition). Pearson.
- Bowerman, B.L., O'Connell, R. and Murphree, E. (2013). Business statistics in practice (7th edition). McGraw-Hill

## Calculator

A basic calculator with specific keys shown below is required in this unit since it will be used in all class tests and final exam. You may find it useful, but it is not necessary, to have a statistical calculator that has in-built statistical functions. There are several types of these:

- The lowest level statistical calculator has function keys such as the mean and standard deviation but no other statistical function keys.
- The next level above also has function keys for correlation and linear regression. An example is one of the Casio fx series such as the 82 or 100 series, but there are many others.

In any case, your calculator should include the following keys:

$x!$       $e^x$       ${}^nC_r$

You need to bring your calculator to every session class.

## MGSM iLearn

The web page for this unit can be found at: <https://ilearn.mq.edu.au/>.

As an enhancement to this unit, there is a series of multiple choice and short answer questions that you may try on iLearn, Macquarie University's online learning management system. Answers will also be provided on iLearn. To access these, just log in via the link above.

The purpose of these questions is for practice only. They will not be used for assessment

purposes but is hoped that you will attempt them for your own benefit.

For any enquiries regarding difficulties accessing these questions please contact Mr Ariel Alcantara on email at: [ariel.alcantara@mq.edu.au](mailto:ariel.alcantara@mq.edu.au).

## Technology

Access to a personal computer and internet connection is required to access learning material/ resources online on Macquarie University's online learning management system called iLearn.

Students will also be required to gain access to statistical software called Minitab 16. Further instructions are provided in the class iLearn page.

## Unit Schedule

**Students are required to attend all classes.** Please only attend the class you are enrolled in as reflected in your e-Student account. This unit will be presented over 10 sessions as follows (*The proposed program might be subject to some minor changes as the term progresses (TBA)*).

**Class sessions are scheduled from:** 6pm to 10pm of every Monday starting from 24 June 2019 (session 1) until 26 August 2019 (session 10).

**Final exam week:** 2 - 7 September 2019 (The exam timetable will be available on 10 July 2019 at <https://students.mgsm.edu.au/sydney-students/units/exams/>)

Session	Topics and textbook chapters covered
1	Introduction to statistics - ch 1.1 Sampling procedures - ch 1.2 - 1.3 Summarising data - ch 1.4 - 1.7 Measures of centre - ch 1.8 - 1.14 Other statistical measures - ch 1.13 - 1.14, 1.16, 1.18 - 1.19 Data analytics - ch 1.20
2	Measures of variation - ch 2.1 - 2.3, 2.5 - 2.7 Using Microsoft Excel - ch 2.9 Using Minitab - ch 2.11 Normal distribution - ch 2.13 Areas under the normal curve - ch 2.14 - 2.18 Applications - ch 2.19
3	Estimation - ch 3.1 - 3.3 Confidence intervals - ch 3.4 - 3.10 Random variables - ch 3.13 - 3.16 Factorials, permutations and combinations - ch 3.17 - 3.19 Lotto type games - ch 3.20

4	<p>Correlation - ch 4.1 - 4.8</p> <p>Time series models - ch 4.9 - 4.11</p> <p>Regression models - ch 4.12 - 4.19</p> <p>Exponential smoothing models - ch 4.23 - 4.28</p> <p>Seasonal data - ch 4.29 - 4.30</p> <p>Lag effects - ch 4.31 - 4.33</p>
5	<p>Categorical data - ch 5.1 - 5.3</p> <p>Single variable data - ch 5.4 - 5.7</p> <p>Contingency tables - ch 5.8 - 5.10</p>
6	<p>Introduction to hypothesis testing - ch 6.1 - 6.5</p> <p>Power of a test - ch 6.6</p> <p>One-sample tests - ch 6.7 - 6.12</p> <p>Using Minitab - ch 6.13 - 6.16</p>
7	<p>Analysis of variance (one-way) - ch 8.1 - 8.3, 8.5</p> <p>Multiple comparisons - ch 8.8 - 8.9</p> <p>Analysis of variance (two-way) - ch 8.10</p> <p>Using Minitab - ch 8.11</p> <p>Visual displays - ch 8.13 - 8.19</p>
8	<p>Odds and probability - ch 9.1 - 9.3</p> <p>Odds ratios - ch 9.4</p> <p>Binary logistics regression - Single covariate - ch 9.5 - 9.7</p> <p>Using Minitab - ch 9.8 - 9.9</p> <p>Testing of parameters - ch 9.10 - 9.12</p> <p>Binary logistic regression - Multiple covariate - ch 9.13</p>
9	<p>Queueing systems - ch 12.1</p> <p>Definitions and parameters - ch 12.2 - 12.9</p> <p>A simple queue - ch 12.10</p> <p>Calculation of probabilities and outcomes - ch 12.11, 12.13 - 12.14</p> <p>Multiple server queues - ch 12.16 - 12.22</p>
10	<p>General course summary</p> <p>Case studies</p> <p>Outline of the final examination</p>

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/policy_central/) ([https://staff.mq.edu.au/policy\\_central/](https://staff.mq.edu.au/policy_central/))



[mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central](http://mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central)). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](http://students.mq.edu.au/support/study/student-policy-gateway) (<http://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)

- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

### Learning outcomes

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

### Assessment tasks

- Individual assignment

- In-class test
- Final examination

## PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

### Learning outcomes

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

### Assessment tasks

- Individual assignment
- In-class test
- Final examination

## PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

### Learning outcomes

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data

to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.

- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## **Assessment tasks**

- Individual assignment
- In-class test
- Final examination

## **PG - Research and Problem Solving Capability**

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

## **Learning outcomes**

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

## **Assessment tasks**

- Individual assignment
- In-class test
- Final examination

## PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

### Learning outcomes

- Evaluate disparate data and information using appropriate quantitative tools to evidence and formulate well-informed and robust strategic business decisions.
- Using appropriate quantitative research tools, evaluate and synthesise quantitative data to help assess the implications of strategic decisions from a whole of entity perspective, and across a wide spectrum of stakeholders.
- From a quantitative point of view, critically assess and integrate ethical, social and environmental factors into business decision-making and management practices that are also commercially viable.
- Apply a range of research tools and models of business performance and productivity to measure and track sustainable value creation across organisational processes and projects.

### Assessment tasks

- Individual assignment
- In-class test
- Final examination

## Changes from Previous Offering

**Assessment tasks:** None

**Delivery and resources:** None

**Unit schedule:** None

## Alignment of this unit with MGSM's mission-driven attributes

- **Leadership:** The unit develops quantitative skills required of leaders with respect to the wide range of techniques available to deal with array of information in order to make well-informed and robust strategic decisions.
- **Global mindset:** The unit enhanced my ability to assess the implications of strategic

decisions from a whole of entity perspective, across of a national and international spectrum of stakeholders.

- **Citizenship:** The unit encouraged me to apply an accurate and fair approach to deriving business strategies and disclosure of any difficulties or ethical issues that may arise from them.
- **Creating sustainable value:** The unit assisted my adoption of a forward-looking perspective on the impact of qualitative decisions and how they may be readily adapted if parameters change in the future.

## Attendance Policy (MGSM)

The interactive environment of the classroom is central to the MGSM experience. Students are required to attend the full duration of all classes for the units in which they are enrolled. We recognise that exceptional circumstances may occur, such as unavoidable travel on behalf of your organization or the serious illness or injury of you or a close family member.

Special consideration may be given for a maximum of 20% non-attendance for such circumstances as long as lecturers are contacted in advance, and supporting documentation provided, to request exemption from attendance. Failure to abide by these conditions may result in automatic withdrawal, with academic and/or financial penalty. The full Student Attendance Policy is published in the MGSM Student Handbook at <https://students.mgsm.edu.au/handbook>.

## Content Disclaimer

These unit materials and the content of this unit are provided for educational purposes only and no decision should be made based on the material without obtaining independent professional advice relating to the particular circumstances involved.